

## Stroke Risk Factors and Symptoms

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# Brain Attack

## Risk Factors for a Stroke

Stroke prevention is still the best medicine. The most important treatable conditions linked to stroke are:

- High blood pressure.** *Treat it.* Eat a balanced diet, maintain a healthy weight, and exercise to reduce blood pressure. Drugs are also available.
  - **Cigarette smoking.** *Quit.* Medical help is available to help quit.
  - **Heart disease.** *Manage it.* Your doctor can treat your heart disease and may prescribe medication to help prevent the formation of clots. If you are over 50, NINDS scientists believe you and your doctor should make a decision about aspirin therapy.
  - **Diabetes.** *Control it.* Treatment can delay complications that increase the risk of stroke.
  - **Transient ischemic attacks (TIAs).** *Seek help.* TIAs are small strokes that last only for a few minutes or hours. They should never be ignored and can be treated with drugs or surgery.
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## Symptoms of a Stroke

**If you see or have one or more of these symptoms, don't wait, call 911 right away!**

- Sudden numbness or weakness of face, arm, or leg, especially on one side of the body.
- Sudden confusion or trouble speaking or understanding speech.
- Sudden trouble seeing in one or both eyes.
- Sudden trouble walking, dizziness, or loss of balance or coordination
- Sudden severe headache with no known cause.

Treatment can be more effective if given quickly. Every minute counts!

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More information on stroke

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Prepared by:  
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National Institute of Neurological Disorders and Stroke  
National Institutes of Health  
Bethesda, MD 20892

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## NINDS Stroke Information Page

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### What is Stroke?

A stroke occurs when the blood supply to the part of the brain is suddenly interrupted (ischemic) or when a blood vessel in the brain bursts, spilling blood into the spaces surrounding the brain cells (hemorrhagic). The symptoms of stroke are easy to spot: sudden numbness or weakness, especially on one side of the body; sudden confusion or trouble speaking or understanding speech; sudden trouble seeing in one or both eyes; sudden trouble walking; dizziness; or loss of balance or coordination. Brain cells die when they no longer receive oxygen and nutrients from the blood or when they are damaged by sudden bleeding into or around the brain. These damaged cells can linger in a compromised state for several hours. With timely treatment, these cells can be saved. Stroke is diagnosed through several techniques: a short neurological examination, blood tests, CT scans, MRI scans, Doppler ultrasound, and arteriography. Stroke seems to run in some families. Family members may have a genetic tendency for stroke or share a lifestyle that contributes to stroke. The most important risk factors for stroke are hypertension, heart disease, diabetes, and cigarette smoking. Other risks include heavy alcohol consumption, high blood cholesterol levels, illicit drug use, and genetic or congenital conditions. Some risk factors for stroke apply only to women. Primary among these are pregnancy, childbirth, and menopause.

### Is there any treatment?

Generally, there are three treatment stages for stroke: prevention, therapy immediately after stroke, and post-stroke rehabilitation. Therapies to prevent stroke are based on treating an individual's underlying risk factors. Acute stroke therapies try to stop a stroke while it is happening. Post-stroke rehabilitation is to overcome disabilities that result from stroke damage. Medication or drug therapy is the most common treatment for stroke. Surgery can be used to prevent stroke, to treat acute stroke, or to repair vascular damage or malformations in and around the brain. For most stroke patients, physical therapy is the cornerstone of the rehabilitation process. Another type of therapy involving relearning daily activities is occupational therapy (OT). OT also involves exercise and training to help the stroke patient relearn everyday activities such as eating, drinking and swallowing, dressing, bathing, cooking, reading and writing, and toileting. Speech therapy is appropriate for patients who have no deficits in cognition or thinking, but have problems understanding speech or written words, or problems forming speech.

### What is the prognosis?

Although stroke is a disease of the brain, it can affect the entire body. Some of the disabilities that can result from stroke include paralysis, cognitive deficits, speech problems, emotional difficulties, daily living problems, and pain.

### What research is being done?

Some brain damage that results from stroke may be secondary to the initial death of brain cells caused by the lack of blood flow to the brain tissue. This brain damage is a result of a toxic reaction to the primary damage. Researchers are studying the mechanisms of this toxic reaction and ways to prevent this secondary injury to the brain. Scientists hope to develop neuroprotective agents to prevent this damage. Another area of research involves experiments with vasodilators, medication that expand or dilate blood vessels and thus increase the blood flow to the brain. Basic research has also focused on the genetics of stroke and stroke risk factors. One area of research involving genetics is gene therapy. One promising area of stroke animal research involves hibernation. The dramatic decrease of blood flow to the brain in hibernating animals is extensive enough that it would kill a non-hibernating animal. If scientists can discover how animals hibernate without experiences

brain damage, then maybe they can discover ways to stop the brain damage associated with decreased blood flow in stroke patients. Other studies are looking at the role of hypothermia, or decreased body temperature, on metabolism and neuroprotection. Scientists are working to develop new and better ways to help the brain repair itself and restore important functions to the stroke patients. Some evidence suggests that transcranial magnetic stimulation (TMS), in which a small magnetic current is delivered to an area of the brain, may possibly increase brain plasticity and speed up recover of function after stroke.

Select this link to view a list of studies currently seeking patients.

## Organizations

### **American Stroke Association: A Division of American Heart Association**

7272 Greenville Avenue  
Dallas, TX 75231-4596  
[strokeassociation@heart.org](mailto:strokeassociation@heart.org)  
<http://www.strokeassociation.org>  
Tel: 1-888-4STROKE (478-7653)  
Fax: 214-706-5231

### **Brain Aneurysm Foundation**

12 Clarendon Street  
Boston, MA 02116  
[information@bafound.org](mailto:information@bafound.org)  
<http://www.bafound.org>  
Tel: 617-723-3870  
Fax: 617-723-8672

### **National Stroke Association**

9707 East Easter Lane  
Englewood, CO 80112-3747  
[info@stroke.org](mailto:info@stroke.org)  
<http://www.stroke.org>  
Tel: 303-649-9299 800-STROKES (787-6537)  
Fax: 303-649-1328

### **Stroke Clubs International**

805 12th Street  
Galveston, TX 77550  
[strokeclub@aol.com](mailto:strokeclub@aol.com)  
Tel: 409-762-1022

### **National Aphasia Association**

29 John Street  
Suite 1103  
New York, NY 10038  
[naa@aphasia.org](mailto:naa@aphasia.org)  
<http://www.aphasia.org>  
Tel: 212-267-2814 800-922-4NAA (4622)  
Fax: 212-267-2812

### **Children's Hemiplegia and Stroke Assocrn. (CHASA)**

4101 West Green Oaks Blvd.  
PMB #149  
Arlington, TX 76016  
[info5@chasa.org](mailto:info5@chasa.org)  
<http://www.hemikids.org>  
Tel: 817-492-4325

**Hazel K. Goddess Fund for Stroke Research in Women**

785 Park Avenue

New York, NY 10021-3552

[courtneymartin@thegoddessfund.org](mailto:courtneymartin@thegoddessfund.org)<http://www.thegoddessfund.org>

Tel: 212-734-8067

Fax: 212-288-2160

**American Health Assistance Foundation**

22512 Gateway Center Drive

Clarksburg, MD 20871

[info@ahaf.org](mailto:info@ahaf.org)<http://www.ahaf.org>

Tel: 301-948-3244 800-437-AHAF (2423)

Fax: 301-258-9454

**Related NINDS Publications and Information**

- Stroke: Hope Through Research

An informational booklet about stroke compiled by the National Institute of Neurological Disorders and Stroke (NINDS).

- Stroke Risk Factors and Symptoms

A short document describing stroke risk factors and symptoms.

- Know Stroke. Know the Signs. Act in Time.

Stroke publication education booklet

- Post-Stroke Rehabilitation Fact Sheet

Post-stroke rehabilitation fact sheet from NINDS, the National Institute of Neurological Disorders and Stroke.

- Stroke Rehabilitation Information Page

A fact sheet on stroke rehabilitation.

- Rehabilitaci3n despu3s de una Apoplej3a

Informaci3n sobre la rehabilitaci3n despu3s de una apoplej3a/Spanish-language fact sheet on stroke rehabilitation prepared by the National Institute of Neurological Disorders and Stroke (NINDS).

- Brain Basics: Preventing Stroke

Information on preventing stroke, including stroke risk factors and warning signs, compiled by the National Institute of Neurological Disorders and Stroke (NINDS).

- Previniendo la Apoplej3a (Preventing Stroke)

Informaci3n del Previniendo la Apoplej3a (Preventing Stroke) compilado por el Instituto Nacional de los Des3rdenes y del Movimiento Neurol3gicos (NINDS).

- Ataque Cerebral (Stroke)

Informaci3n del Ataque Cerebral

- Questions and Answers About Stroke

A backgrounder with questions and answers about stroke.

- Accidente Cerebrovascular: Esperanza en la Investigaci3n

Informaci3n de Accidente Cerebrovascular/Spanish-language booklet on stroke prepared by the National Institute of Neurological Disorders and Stroke (NINDS).

- Transient Ischemic Attack

Transient Ischemic Attack (TIA) information sheet compiled by the National Institute of Neurological Disorders and Stroke (NINDS).

- Multi-Infarct Dementia

Multi-infarct dementia information sheet compiled by the National Institute of Neurological Disorders and Stroke (NINDS).

- Stroke Scales and Related Information

Referral page to the Brain Attack Coalition "Acute Stroke Toolbox" site for the NIH Stroke Scale, stroke admission orders, and other items for clinicians treating acute stroke.

- Rewiring the Brain: A Natural Chemical Improves Motor Skills After Stroke

August 2002 news summary on an animal study of a potential treatment for stroke.

- Another Reason to Avoid a Sugar High: Study Links High Blood Sugar to Mortality After Stroke

August 2002 news summary on hyperglycemia (high blood sugar) and stroke.

- Children with Porencephaly, Stroke, and Cerebral Palsy Sought for Study

Lay-language descriptions of new program announcements and clinical trials seeking patient volunteers.

- NINDS Seeks Patients for a Stroke Study

Lay-language descriptions of new NINDS program announcements, requests for applications, and clinical studies seeking patients.

- Workshop on Perinatal and Childhood Stroke

Report of the National Institutes of Neurological Disorders and Stroke Workshop on Perinatal and Childhood Stroke, held September 18 - 19, 2000.

- Improving the Chain of Recovery for Acute Stroke in Your Community: A National Institute of Neurological Disorders and Stroke Symposium

- Proceedings of a National Symposium on Rapid Identification and Treatment of Acute Stroke

Proceedings of a National Symposium on Rapid Identification and Treatment of Acute Stroke held December 12-13, 1996, to coordinate nationwide efforts aimed at implementing acute stroke therapy for all types of stroke.

- 2002 Report of the Stroke Progress Review Group

April 2002 report from a collaborative effort of scientists, clinicians, industry representatives, and patient advocates charged by NINDS with the task of setting overall priorities for stroke research.

- NINDS Stroke Disparities Advisory Panel Meeting

NINDS Stroke Disparities Advisory Panel Meeting

- Stroke Testimony before the House Committee on Energy and Commerce Subcommittee on Health

NINDS opening statement to the House Committee on Energy and Commerce Subcommittee on Health, June 6, 2002.

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Provided by:  
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## Brain Basics: Preventing Stroke

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Brain Basics: Preventing Stroke

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## Introduction

If you're like most Americans, you plan for your future. When you take a job, you examine its benefit plan. When you buy a home, you consider its location and condition so that your investment is safe. Today, more and more Americans are protecting their most important asset--their health. Are you?

Stroke ranks as the third leading killer in the United States. A stroke can be devastating to individuals and their families, robbing them of their independence. It is the most common cause of adult disability. Each year more than 500,000 Americans have a stroke, with about 145,000 dying from stroke-related causes. Officials at the National Institute of Neurological Disorders and Stroke (NINDS) are committed to reducing that burden through biomedical research.

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## What is a Stroke?

A stroke, or "brain attack," occurs when blood circulation to the brain fails. Brain cells can die from decreased blood flow and the resulting lack of oxygen. There are two broad categories of stroke: those caused by a blockage of blood flow and those caused by bleeding. While not usually fatal, a **blockage of a blood vessel** in the brain or neck, called an ischemic stroke, is the most frequent cause of stroke and is responsible for about 80 percent of strokes. These blockages stem from three conditions: the formation of a clot within a blood vessel of the brain or neck, called thrombosis; the movement of a clot from another part of the body such as the heart to the neck or brain, called embolism; or a severe narrowing of an artery in or leading to the brain, called stenosis. **Bleeding into the brain** or the spaces surrounding the brain causes the second type of stroke, called hemorrhagic stroke.

Two key steps you can take will lower your risk of death or disability from stroke: know stroke's warning signs and control stroke's risk factors. Scientific research conducted by the NINDS has identified warning signs and a large number of risk factors.

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## What are Warning Signs of a Stroke?

Warning signs are clues your body sends that your brain is not receiving enough oxygen. If you observe one or more of these signs of a stroke or "brain attack," don't wait, call a doctor or 911 right away!

- Sudden numbness or weakness of face, arm or leg, especially on one side of the body
- Sudden confusion, trouble speaking or understanding
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness, loss of balance or coordination
- Sudden severe headache with no known cause

Other danger signs that may occur include double vision, drowsiness, and nausea or vomiting. Sometimes the warning signs may last only a few moments and then disappear. These brief episodes, known as transient ischemic attacks or TIAs, are sometimes called "mini-strokes." Although brief, they identify an underlying serious condition that isn't going away without medical help. Unfortunately, since they clear up, many people ignore them. Don't. Heeding them can save your life.

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## What are Risk Factors for a Stroke?

A risk factor is a condition or behavior that occurs more frequently in those who have, or are at greater risk of getting, a disease than in those who don't. Having a risk factor for stroke doesn't mean you'll have a stroke. On the other hand, not having a risk factor doesn't mean you'll avoid a stroke. But your risk of stroke grows as the number and severity of risk factors increases.

Stroke occurs in all age groups, in both sexes, and in all races in every country. It can even occur before birth, when the fetus is still in the womb. In African-Americans, the death rate from stroke is almost twice that of the white population. Scientists have found more and more severe risk factors in some minority groups and continue to look for patterns of stroke in these groups.

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## What Are the Treatable Risk Factors?

Some of the most important treatable risk factors for stroke are:

- **High blood pressure.** Also called hypertension, this is by far the most potent risk factor for stroke. If your blood pressure is high, you and your doctor need to work out an individual strategy to bring it down to the normal range. Some ways that work: Maintain proper weight. Avoid drugs known to raise blood pressure. Cut down on salt. Eat fruits and vegetables to increase potassium in your diet. Exercise more. Your doctor may prescribe medicines that help lower blood pressure. Controlling blood pressure will also help you avoid heart disease, diabetes, and kidney failure.
- **Cigarette smoking.** Cigarette smoking has been linked to the buildup of fatty substances in the carotid artery, the main neck artery supplying blood to the brain. Blockage of this artery is the leading cause of stroke in Americans. Also, nicotine raises blood pressure; carbon monoxide reduces the amount of oxygen your blood can carry to the brain; and cigarette smoke makes your blood thicker and more likely to clot. Your doctor can recommend programs and medications that may help you quit smoking. By quitting, at any age, you also reduce your risk of lung disease, heart disease, and a number of cancers including lung cancer.
- **Heart disease.** Common heart disorders such as coronary artery disease, valve defects, irregular heart beat, and enlargement of one of the heart's chambers can result in blood clots that may break loose

and block vessels in or leading to the brain. The most common blood vessel disease, caused by the buildup of fatty deposits in the arteries, is called atherosclerosis. Your doctor will treat your heart disease and may also prescribe medication, such as aspirin, to help prevent the formation of clots. Your doctor may recommend surgery to clean out a clogged neck artery if you match a particular risk profile. If you are over 50, NINDS scientists believe you and your doctor should make a decision about aspirin therapy. A doctor can evaluate your risk factors and help you decide if you will benefit from aspirin or other blood-thinning therapy.

- *Warning signs or history of stroke.* If you experience a TIA, get help at once. Many communities encourage those with stroke's warning signs to dial 911 for emergency medical assistance. If you have had a stroke in the past, it's important to reduce your risk of a second stroke. Your brain helps you recover from a stroke by drawing on body systems that now do double duty. That means a second stroke can be twice as bad.
- *Diabetes.* You may think this disorder affects only the body's ability to use sugar, or glucose. But it also causes destructive changes in the blood vessels throughout the body, including the brain. Also, if blood glucose levels are high at the time of a stroke, then brain damage is usually more severe and extensive than when blood glucose is well-controlled. Treating diabetes can delay the onset of complications that increase the risk of stroke.

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## Do You Know Your Stroke Risk?

Some of the most important risk factors for stroke can be determined during a physical exam at your doctor's office. If you are over 55 years old, a worksheet in a pamphlet available from the NINDS can help you estimate your risk of stroke and show the benefit of risk-factor control.

The worksheet was developed from NINDS-supported work in the well-known Framingham Study. Working with your doctor, you can develop a strategy to lower your risk to average or even below average for your age.

Many risk factors for stroke can be managed, some very successfully. Although risk is never zero at any age, by starting early and controlling your risk factors you can lower your risk of death or disability from stroke. With good control, the risk of stroke in most age groups can be kept below that for accidental injury or death.

For information on other neurological disorders or research programs funded by the National Institute of Neurological Disorders and Stroke, contact the Institute's Brain Resources and Information Network (BRAIN) at:

BRAIN  
P.O. Box 5801  
Bethesda, MD 20824  
(800) 352-9424  
[www.ninds.nih.gov](http://www.ninds.nih.gov)

Americans have shown that stroke is preventable and treatable. A better understanding of the causes of stroke has helped Americans make lifestyle changes that have cut the stroke death rate nearly in half in the last two decades.

More than a million stroke survivors suffer little or no long-lasting disability from their strokes. Another two million, however, live with the crippling and lifelong disabilities of paralysis, loss of speech, and poor memory. Scientists at the NINDS predict that, with continued attention to reducing the risks of stroke and by using currently available therapies and developing new ones, Americans should be able to prevent 80 percent of all strokes by the end of the decade.

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More information on stroke

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